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(54) Title: **PHOTONIC SENSOR PARTICLES AND FABRICATION METHODS**

(57) Abstract: The invention is related to optical particles (10), use of optical particles in sensing applications, and methods of fabricating optical particles that can target a desired analyte. The invention is also related to the self assembly of individual optical particles. An advantage of the invention is that it includes self-assembling individual photonic crystal sensors onto a target. In an embodiment of the invention, a processed sensor structure having two generally opposing surfaces is provided, wherein each of the opposing surfaces have different surface affinities, with a first optical structure formed on one of the opposing surfaces, and a second optical structure formed on the other of the opposing surfaces. The chemically and optically asymmetric opposing surfaces will spontaneously align at an organic liquid/water interface. Changes in the optical response of at least one of the opposing surfaces indicate the presence of a particular analyte for sensing applications.

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